

## Quarterly Progress Report

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### Near-Term Objectives

1) Revise Algorithm Theoretical Basis Document in response to Review Panel comments 2) Continue deployment ocean color buoys in California Current 3) Continue analysis of sun-stimulated fluorescence data 4) Plan for field work in Southern Ocean 5) Plan for bio-optical mooring deployment in Antarctic Circumpolar Current 6) Continue development of information management system.

### Task Progress

#### 1) Algorithm Theoretical Basis Document

Written reviews were received from mail reviewers before the ATBD Panel Review. The panel report has not been received yet.

#### 2) Ocean Color Buoys

I have now deployed 24 drifters in the California Current as part of an ONR research project. Dr. Ricardo Letelier (a postdoctoral researcher) and I determined that there was major error in the ordering of the spectral data as documented in the drifter manuals. This has been corrected and the data are being reanalyzed. We have determined that the average lifetime of the bio-optical sensor is about 60-90 days before either the sensor begins to fail or biofouling becomes severe. We cannot determine which process may be occurring with complete certainty.

Dr. Letelier has shown that there are strong onshore/offshore differences in the amount of fluorescence per unit chlorophyll. These differences are consistent and may reflect both changes in species composition as well as growth rate. The role of photoprotective pigments is also being examined. We will be preparing two papers in the coming months: one will examine the theoretical limits of sun-stimulated fluorescence in the estimation of primary productivity and the other paper will describe the drifter results.

Dr. Letelier is using these results to define future laboratory experiments that will be conducted to examine specific processes that affect fluorescence variability.

### 3) Southern Ocean Field Work

Dr. Letelier will spend four weeks at sea off the Antarctic Peninsula as part of a Long-Term Ecological Research (LTER) study. He will deploy two ocean color drifters as well as one tethered bio-optical buoy to measure the in-water optical properties of the region. He will collect samples for photosynthesis/irradiance experiments to quantify the relationship between fluorescence and productivity. This cruise will begin in early December.

### 4) Bio-optical Mooring

In collaboration with Dr. James Richman, we will deploy a bio-optical mooring just north of the Antarctic Circumpolar Current. This study is part of an NSF-funded program being conducted in cooperation with Australian oceanographers. The mooring will consist of a Satlantic spectroradiometer (identical to the units on the ocean color drifters) and it will be moored at a depth of 50 meters. After three months, the mooring will be released and will then relay its data back to shore using Service Argos. This design results in a significantly cheaper deployment (\$25,000 versus several hundred thousand dollars). Although we hope SeaWiFS will be launched in time for this experiment, the primary objectives are to test the mooring and sampling design as well as the data relay system.

### 5) Information Management

We continue to make progress with our data management system. A prototype system was built under Microsoft Windows to test the functionality of ODBC (Open Data Base Connectivity) and OLE (Object Linking and Embedding). We demonstrated links between desktop applications such as Excel and our data base. The complete SQL Server system (hardware and software) has been ordered and should be delivered this fall.

Client software using PC applications continues to be developed. We also developed a Mosaic interface as a prototype UNIX client. This system is capable of forming SQL queries under Mosaic and passing them to our Ingres relational data base using a custom socket server.

### Anticipated Activities

#### 1) Analysis of Drifter Data

We expect to produce two draft manuscripts this fall. The first will cover the theoretical aspects of fluorescence and productivity. The second paper will present analyses of the drifter data. These results will be used to design laboratory experiments with phytoplankton cultures in 1995. We will

participate in the SeaWiFS primary productivity workshop this fall.

## 2) Field Work

As noted above, a major portion of our activities will be devoted to a four-week cruise off Antarctica in December. We will also deploy the bio-optical mooring in early 1995.

## 3) Information Management

We will continue our implementation of our object-oriented data management system. The complete SQL Server system should be operational by the end of 1994.

## Problems/Corrective Actions

Equipment approvals took longer than expected, resulting in mismatches between price quotes and the eventual invoices.